

What is claimed is:

1. An automatic tracking apparatus for a reflector comprising:  
a surveying machine body;

5 an illumination portion disposed in said surveying  
machine body for illuminating a measurement light toward a reflector;

a light receiving portion which disposed in said surveying  
machine body and which has an image sensor for receiving a reflection  
light image of the measurement light illuminated toward said reflector;

10 arithmetic means for calculating a position of the reflection light  
image from said reflector in an area of said image sensor based on a  
received light of said image sensor;

a rotation mechanism for rotating said surveying machine body  
so as to position said reflector on a light receiving optical axis of said  
15 light receiving portion based on the position obtained by said arithmetic  
means;

a storing portion for storing a quantity of light at each pixel in  
said image sensor; and

an edge position detecting portion for detecting a beginning edge  
20 position and an end edge position of said reflection light image at each  
scanning line in said image sensor,

wherein said arithmetic means calculates the quantity of light at  
each pixel from said storing portion in accordance with an output of said  
edge position detecting portion and calculates positions of the weighted  
25 average in horizontal and vertical directions of said reflection light  
image from a horizontal pixel position and a vertical pixel position.

2. The automatic tracking apparatus for the reflector according to Claim 1, wherein said automatic tracking apparatus reads out the quantity of light at each pixel from said storing portion, and obtains a width between said beginning edge position and said end edge position at each scanning line after calling out the positions from said edge position detecting portion, and decides the scanning line corresponding to the widest line as the position of the weighted average in the horizontal direction, and calculates the position of the weighted average in the vertical direction of the reflection light image based on the quantity of light of the pixel which is existed between said beginning edge position and said end edge position in the scanning line corresponding to the widest line.

3. An automatic tracking apparatus for a reflector comprising:  
a surveying machine body;  
an illumination portion disposed in said surveying machine body, for illuminating a measurement light toward a reflector;  
a light receiving portion which is disposed in said surveying machine body and which has an image sensor for receiving the measurement light from said reflector;  
arithmetic means calculates a position of a reflection light image from said reflector in an area of said image sensor based on a received light of said image sensor;  
a rotation mechanism for rotating said surveying machine body so as to position said reflector on a light receiving optical axis of said light receiving portion based on the position obtained by said arithmetic means;

a first storing portion for storing a quantity of received light of the measurement light from said reflector in scanning; and

a second storing portion for storing said quantity of received light after binarizing,

5        wherein said arithmetic means detects the position of said reflection light image from the quantity of received light which is stored in said first storing portion and the quantity of received light which is binarized and stored in said second storing portion.